ACCELERATOR MASS SPECTROMETRY (AMS) IN TOXICOLOGY AND CARCINOGENESIS. **K.W. Turteltaub.** Molecular and Structural Biology Division & Center for Accelerator Mass Spectrometry, Lawrence Livermore Natl. Lab., Livermore CA 94551, USA.

AMS measures isotope ratios with attomole to zeptomole sensitivity. It is well suited for tracing ^{14}C and other isotopes through biological systems at levels 10^3 - 10^6-fold lower than decay counting can achieve. AMS is being used to assess pharmaco/toxicokinetics, DNA and protein adduction, and metabolism *in vivo* at low doses. Human studies, where chemical and isotope doses can be significantly reduced, are also beginning. In specific applications we have measured the metabolism and binding of ^{14}C-labeled heterocyclic amines and benzene to DNA and proteins. Dose response assessments have been carried out to doses as low as 700 pg benzene /kg body weight. The high sensitivity of AMS for isotope detection and the potential for its use in understanding how animal models reflect humans make AMS a valuable tool for assessing the short and long-term risks posed by toxic or carcinogenic chemicals. In general, AMS is useful for assessing any physiological event where high sensitivity is needed. This work performed under the auspices of the U.S. DOE by LLNL (W-7405-ENG-48) and partially supported by NIH (CA55861 and ES04705) and USAMRDC #MM4559FLB.